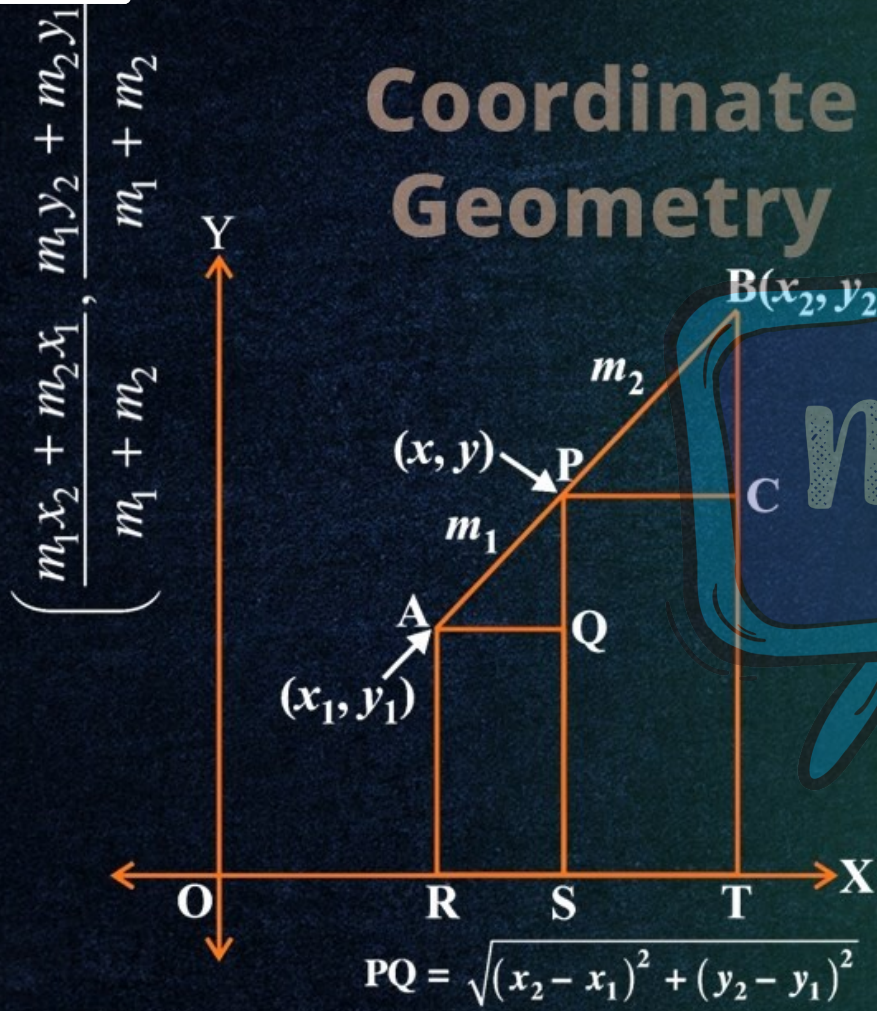


# Coordinate Geometry



# CLASS - 10

# MATHEMATICS

## CH - 7

## Coordinate Geometry

### CBSE Board

### Previous Year Questions - 2

### Shubham Tiwari

18. Show that the points (7, 10), (-2, 5) and (3, -4) are vertices of an isosceles right triangle.

(CBSE 2020)

Solu. Let  $A(7, 10)$   $C(3, -4)$   
 $B(-2, 5)$

AB by distance formula.

$$AB = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$AB = \sqrt{(7 + 2)^2 + (10 - 5)^2}$$

$$AB = \sqrt{9^2 + 5^2}$$

$$= 81 + 25$$

$$AB = \sqrt{106} \text{ Unit}$$

$$BC = \sqrt{[3 - (-2)]^2 + (-4 - 5)^2}$$

$$= \sqrt{(3+2)^2 + (-9)^2}$$

$$\sqrt{5^2 + 9^2}$$

$$BC = \sqrt{25 + 81} = \sqrt{106} \text{ Unit}$$

$$CA = \sqrt{(7-3)^2 + [10-(-4)]^2}$$

$$= \sqrt{4^2 + 14^2}$$

$$= \sqrt{16 + 196}$$

$$CA = \sqrt{212} \text{ unit}$$

$AB = BC$  { Prove that  $\Delta ABC$  is an  
isosceles  $\Delta$ . }

By Pythn. Thm.



$$AC^2 = 212 \text{ unit}$$

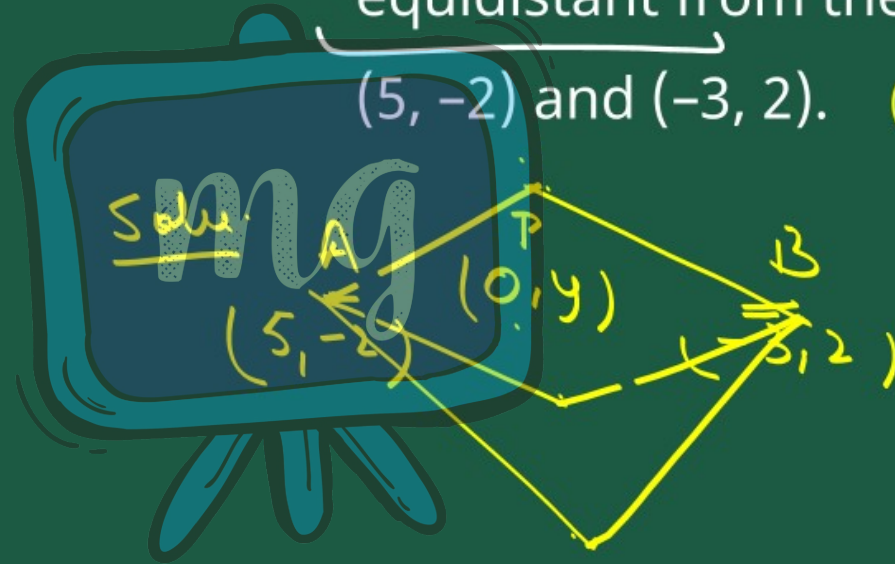
$$\begin{aligned} AB^2 + BC^2 &= \\ 106 + 106 &= \\ &= 212 \text{ unit} \end{aligned}$$



Hence  $\Delta ABC$  is a right angled  $\Delta$ .  
right angle at B.

19. Find the point on y-axis which is  
equidistant from the points

$(5, -2)$  and  $(-3, 2)$ . (CBSE Delhi 2019)



$$\therefore PA = PB$$

$$\therefore PA^2 = PB^2$$

By distance Formula.

$$(5-0)^2 + (-2-y)^2 = [0-(-3)]^2 + (y-2)^2$$
$$5^2 + \cancel{4} + \cancel{y^2} + 4y = 3^2 + \cancel{y^2} + \cancel{4} - 4y$$

$$4y + 4y = 3^2 - 5^2$$
$$= 9 - 25$$

$$8y = -16$$

$$\frac{-16}{8} = y$$

$$\boxed{-2 = y}$$

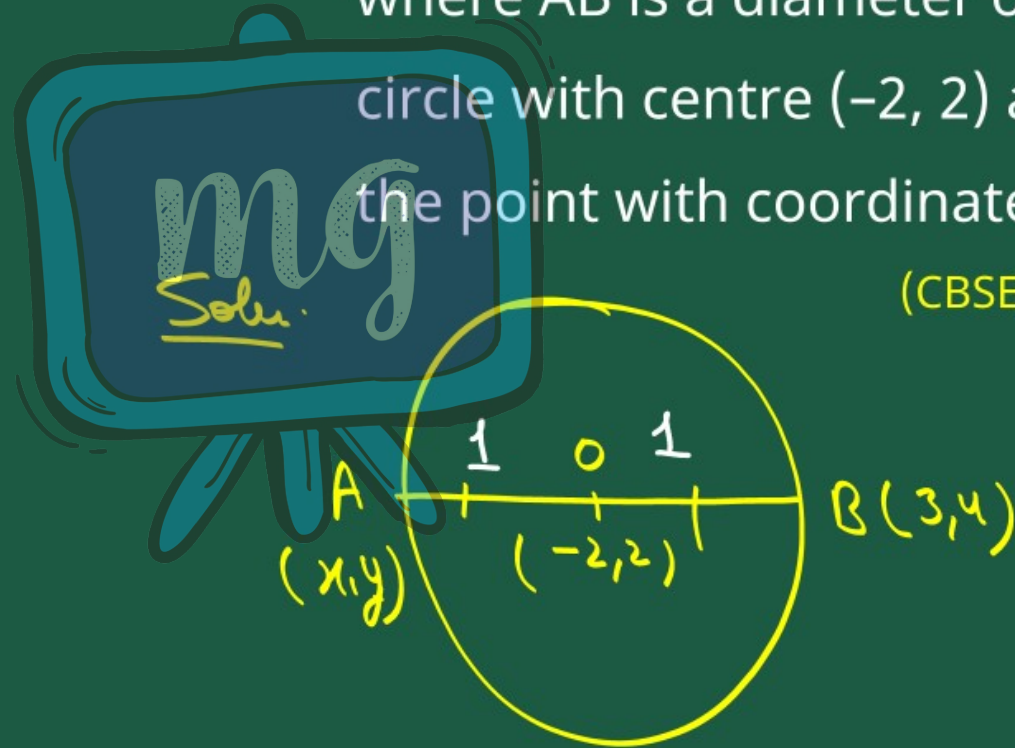
Hence the coordinate is

$(0, -2)$



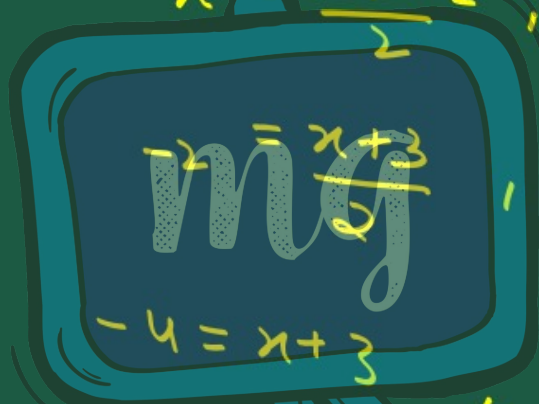
20. Find the coordinates of a point A, where AB is a diameter of the circle with centre  $(-2, 2)$  and B is the point with coordinates  $(3, 4)$ .

(CBSE Delhi 2019)



By midpoint formula,

$$x = \frac{x_1 + x_2}{2}, \quad y = \frac{y_1 + y_2}{2}$$



$$x = \frac{x+3}{2}$$

$$-4 = x+3$$

$$-4-3 = x$$

$$\boxed{-7 = x}$$

$$2 = \frac{y+4}{2}$$

$$4 = y+4$$

$$4-4 = y$$

$$\underline{0 = y}$$

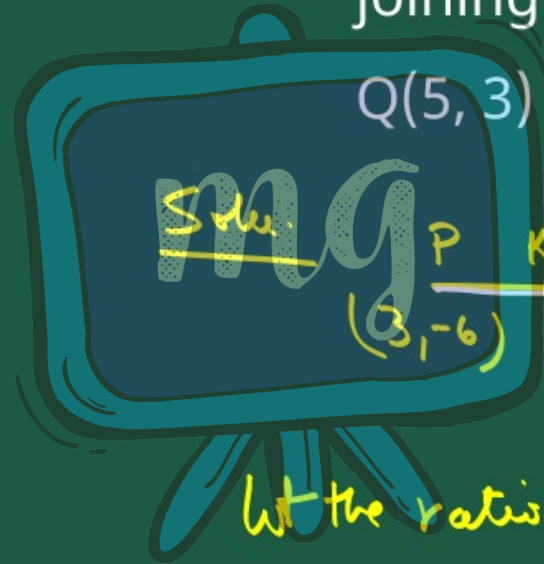
Place the point A lies on.

$(-7, 0)$



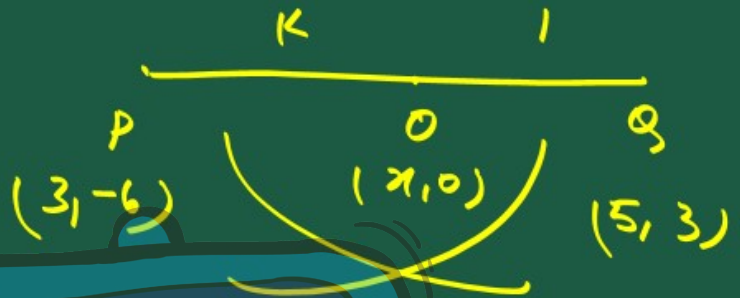
21. In what ratio is the line segment joining the points  $P(3, -6)$  and  $Q(5, 3)$  divided by x-axis?

(CBSE 2019 C)



Let the ratio be  $k:1$

and the coordinates of point O is  $(x, 0)$



By section formula:

$$\frac{5 \times K + 1 \times 3}{K + 1} = x$$

$$\frac{5 \times 2 + 1 \times 3}{2 + 1}$$

$$\frac{10 + 3}{3} = x = \frac{13}{3} = x$$

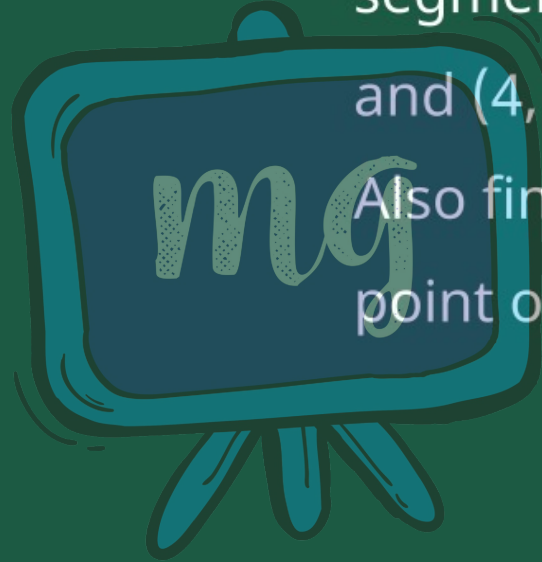
$$\frac{3 \times K + 1 \times -6}{K + 1} = 0$$

$$3K - 6 = 0$$

$$3K = 6$$

$$K = 2$$

22. Find the ratio in which the segment joining the points  $(1, -3)$  and  $(4, 5)$  is divided by x-axis?  
Also find the coordinates of this point on x-axis. (CBSE Delhi 2019)

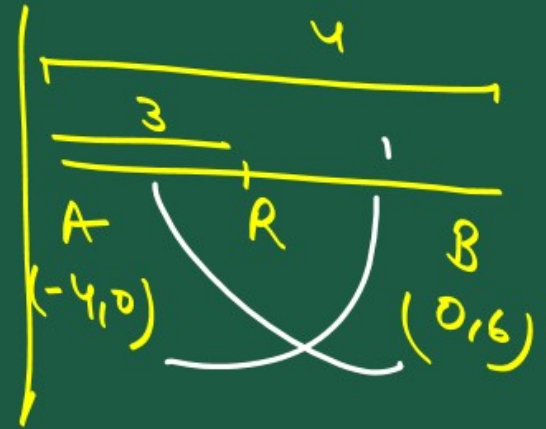


23. The point R divides the line segment AB, where A(-4, 0) and B(0, 6) such that  $AR = \frac{3}{4} AB$  Find the coordinates of R. (CBSE 2019)

Solve.

$AR = \frac{3}{4} AB$

$\frac{AR}{AB} = \frac{3}{4}$



$$\frac{AR}{AB} = \frac{3}{4}$$

$\frac{AB}{AR} = \frac{4}{3}$

$\frac{AB}{AR} - 1 = \frac{4}{3} - 1$

$\frac{AB-AR}{AR} = \frac{4-3}{3}$

$\frac{RB}{AR} = \frac{1}{3}$



big section formula

$$x = \frac{m_2 x_1 + m_1 x_2}{m_1 + m_2}$$
$$y = \frac{m_2 y_1 + m_1 y_2}{m_1 + m_2}$$

$$x = \frac{3 \times 0 + 1 \times (-4)}{3 + 1} = \frac{0 - 4}{4} = -\frac{4}{4} = -1$$

$$y = \frac{3 \times 6 + 1 \times 0}{3 + 1} = \frac{18 + 0}{4} = \frac{18}{4} = \frac{9}{2}$$

Hence the co-ordinate of R

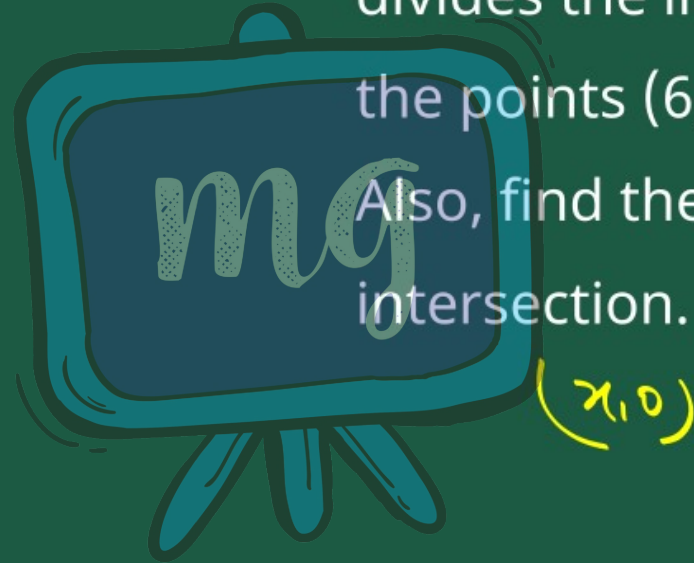
is  $(-1, \frac{9}{2})$



24. Find the ratio in which the y-axis divides the line segment joining the points  $(6, -4)$  and  $(-2, -7)$ .

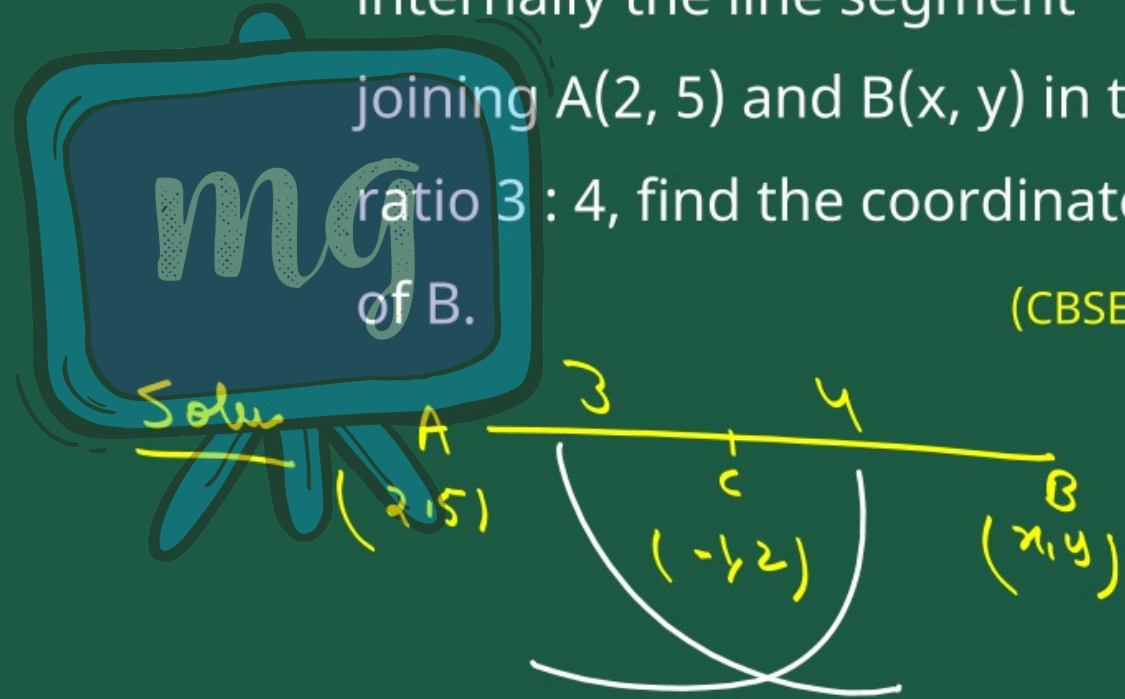
Also, find the point of intersection.

(CBSE 2020)



$$\underline{(0, y)}$$

25. If the point  $C(-1, 2)$  divides internally the line segment joining  $A(2, 5)$  and  $B(x, y)$  in the ratio  $3 : 4$ , find the coordinates of  $B$ . (CBSE 2020)



By section formula

$$x = \frac{m_2 x_1 + m_1 x_2}{m_1 + m_2}$$

$$y = \frac{m_2 y_1 + m_1 y_2}{m_1 + m_2}$$

$$-1 = \frac{3x + 4 \times 2}{3 + 4}$$

$$2 = \frac{3y + 4 \times 5}{3 + 4}$$

$$-7 = 3x + 8$$

$$14 = 3y + 20$$

$$-7 - 8 = 3x$$

$$14 - 20 = 3y$$

$$\begin{array}{l|l} -15 = 3x & x = -5 \\ -15/3 = x & \end{array}$$

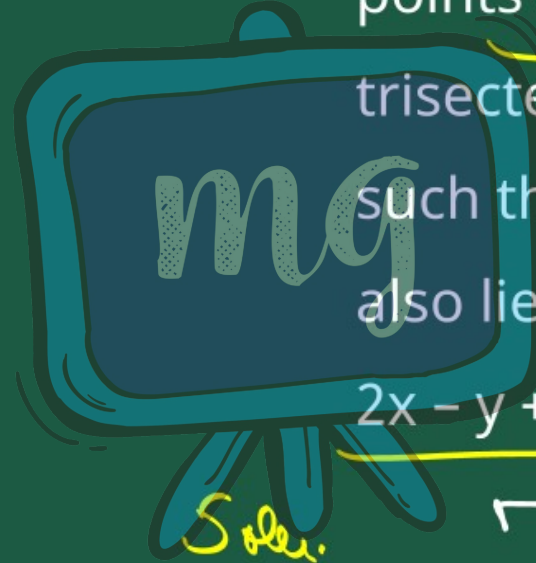
$$\begin{array}{l|l} -6 = 3y & y = -2 \\ -6/3 = y & \end{array}$$

Hence the co-ordinate of B point

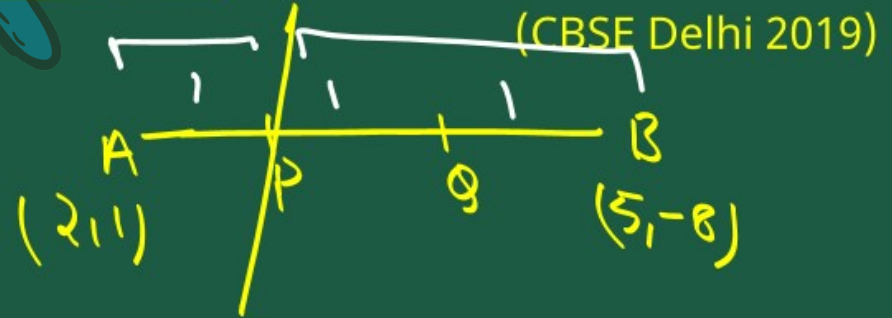
is  $(-5, -2)$

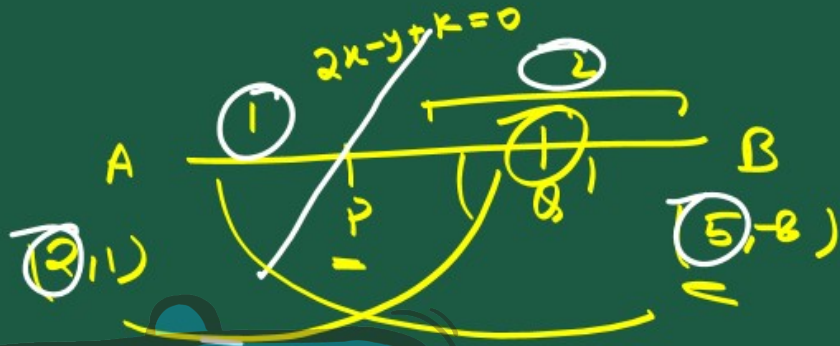


26. The line segment joining the points  $A(2, 1)$  and  $B(5, -8)$  is trisected at the points  $P$  and  $Q$  such that  $P$  is nearer to  $A$ . If  $P$  also lies on the line given by  $2x - y + k = 0$  find the value of  $k$ .



Soln.





By section formula

$$x = \frac{m_2 x_1 + m_1 x_2}{m_1 + m_2}$$

$$y = \frac{m_2 y_1 + m_1 y_2}{m_1 + m_2}$$

$$x = \frac{1 \times 5 + 2 \times 2}{1 + 2}$$
$$x = \frac{5 + 4}{3} = \frac{9}{3} = 3$$

$$y = \frac{1 \times -8 + 2 \times 1}{1 + 2}$$
$$y = \frac{-8 + 2}{3} = \frac{-6}{3} = -2$$

Coordinates of P (3, -2)

$$2x - y + k = 0$$

$$2 \times 3 - (-2) + k = 0$$

$$6 + 2 + k = 0$$

$$8 + k = 0$$

$$k = -8$$



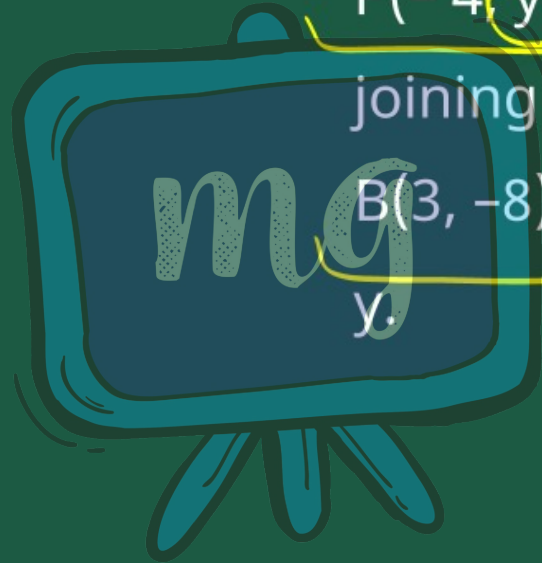
Hence the co-ordinate of O.

is  $(4, -5)$



27. In what ratio does the point  $P(-4, y)$  divide the line segment joining the points  $A(-6, 10)$  and  $B(3, -8)$ ? Hence find the value of  $y$ .

(CBSE 2019)



$$\begin{aligned} &(-4, y) \\ &-4 \end{aligned}$$

28. **Assertion (A)**: Point P(0, 2) is the point of intersection of y-axis with the line  $3x + 2y = 4$ .

**Reason (R)**: The distance of point P(0, 2) from x-axis is 2 units. (CBSE 2020)

- A. Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
- B. Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).
- C. Assertion (A) is true, but Reason (R) is false.
- D. Assertion (A) is false but Reason (R) is true.

$mg$

$3x + 2y = 4$

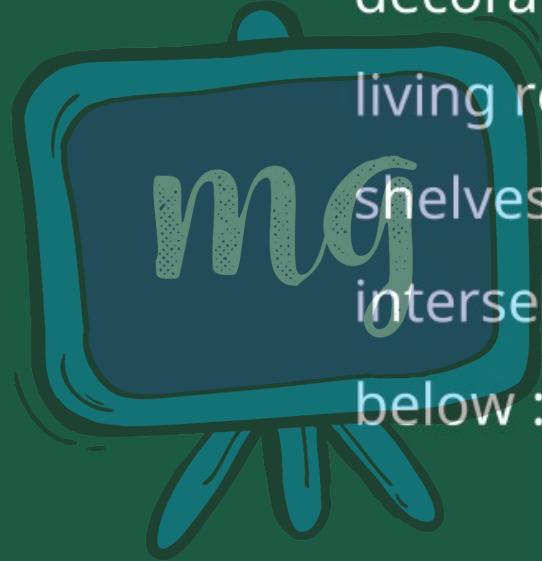
$0, 2$

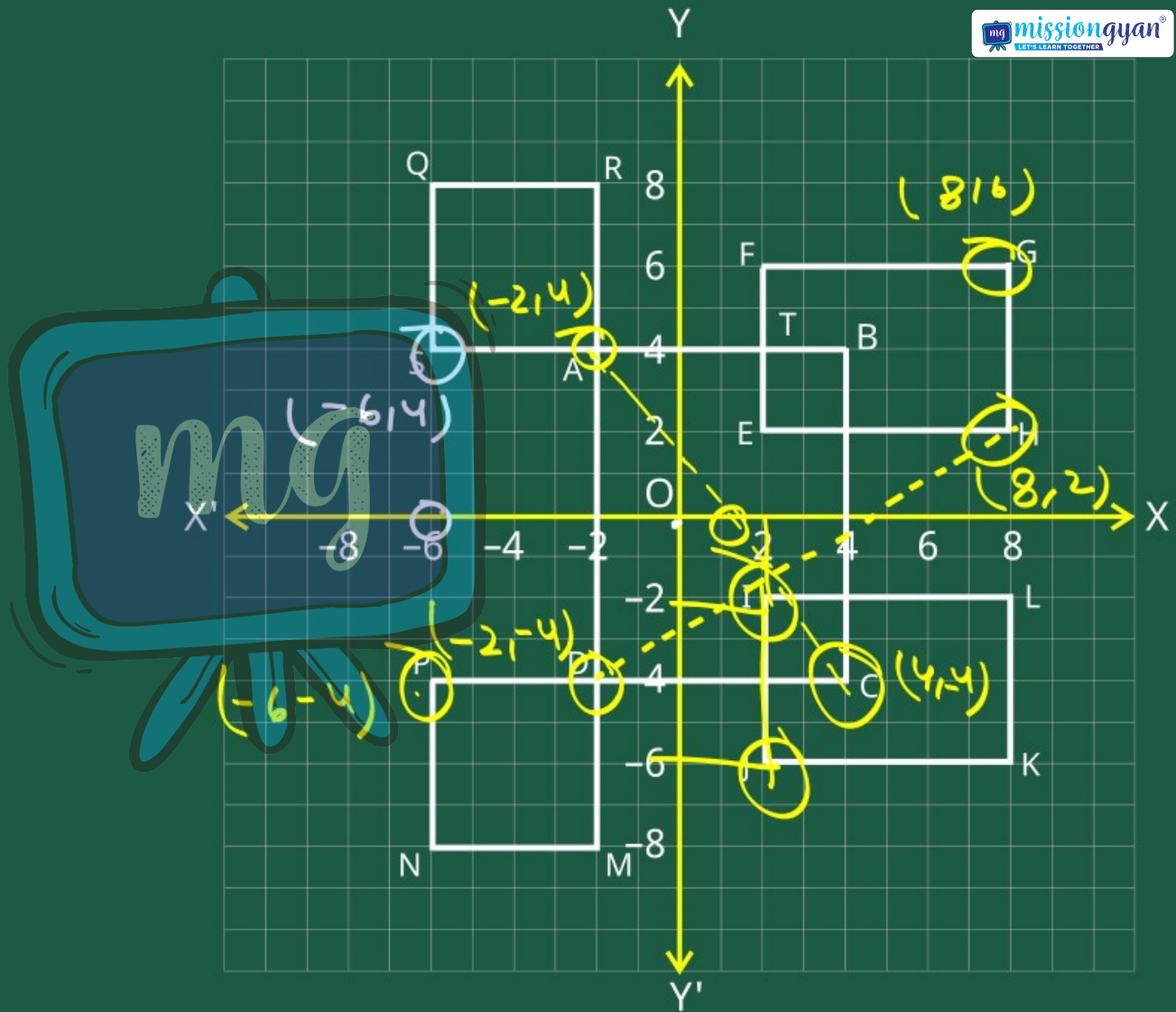
$3(0) + 2(2) = 4$

$0 + 4 = 4$

$4 = 4$

29. **Case Study** : Shivani is an interior decorator. To design her own living room, she designed wall shelves. The graph of intersecting wall shelves is given below : **(CBSE Term I, 2021-22)**





Based on the above information,  
answer the following questions :

I. If O is the origin, then what are  
the coordinates of S ?

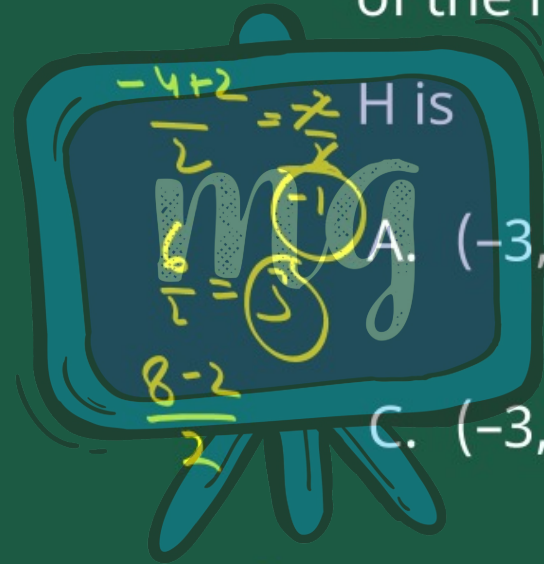
A.  $(-6, -4)$

B.  $(-6, 4)$

C.  $(6, 4)$

D.  $(6, -4)$

II. The coordinates of the mid-point  
of the line segment joining D and

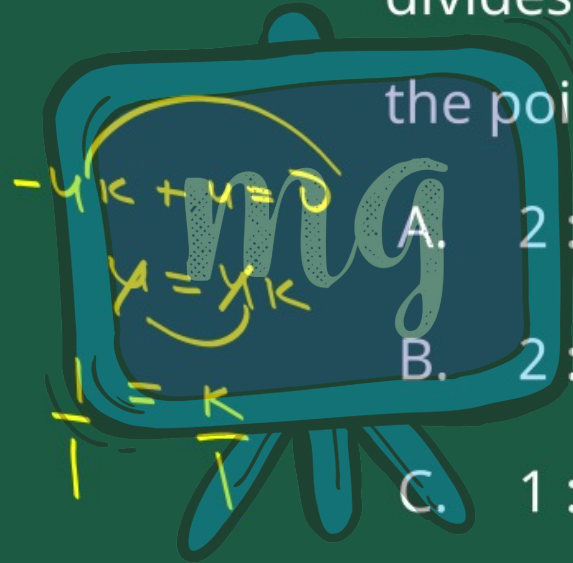


A.  $(-3, \frac{2}{3})$       B.  $(3, -1)$

C.  $(-3, -\frac{2}{3})$       D.  $(3, 1)$



III. The ratio in which the x-axis divides the line-segment joining the points A and C is

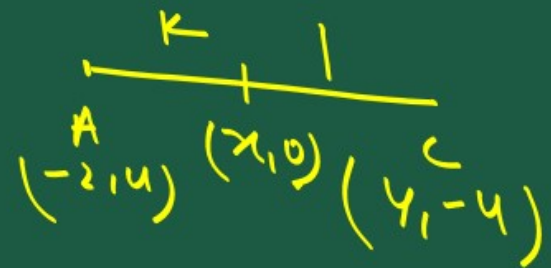


A. 2 : 3

B. 2 : 1

C. 1 : 2

D. 1 : 1



$$\frac{-4k + 4}{k + 1} = 0$$

#### IV. The distance between the points

P and Q is

$(-6, -4)$   $(8, 6)$

A. 16 units

B.  $3\sqrt{74}$  units

C.  $2\sqrt{74}$  units

D.  $\sqrt{74}$  units

$\sqrt{(8+6)^2 + (6+4)^2}$

$\sqrt{(14)^2 + (10)^2}$

$2^2 \times 7^2 + 2^2 \times 5^2$

$2\sqrt{49 + 25}$

$2\sqrt{74}$

V. The coordinates of the vertices of rectangle IJKL are

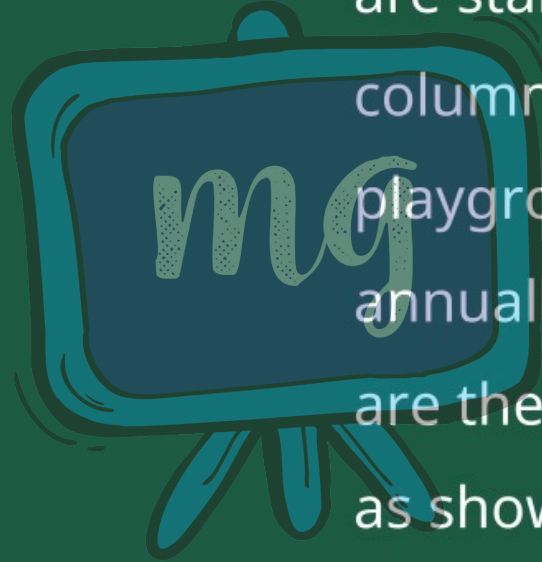
A.  $I(2, 0), J(2, 6), K(8, 6), L(8, 2)$

B.  $I(2, -2), J(2, -6), K(8, -6), L(8, -2)$

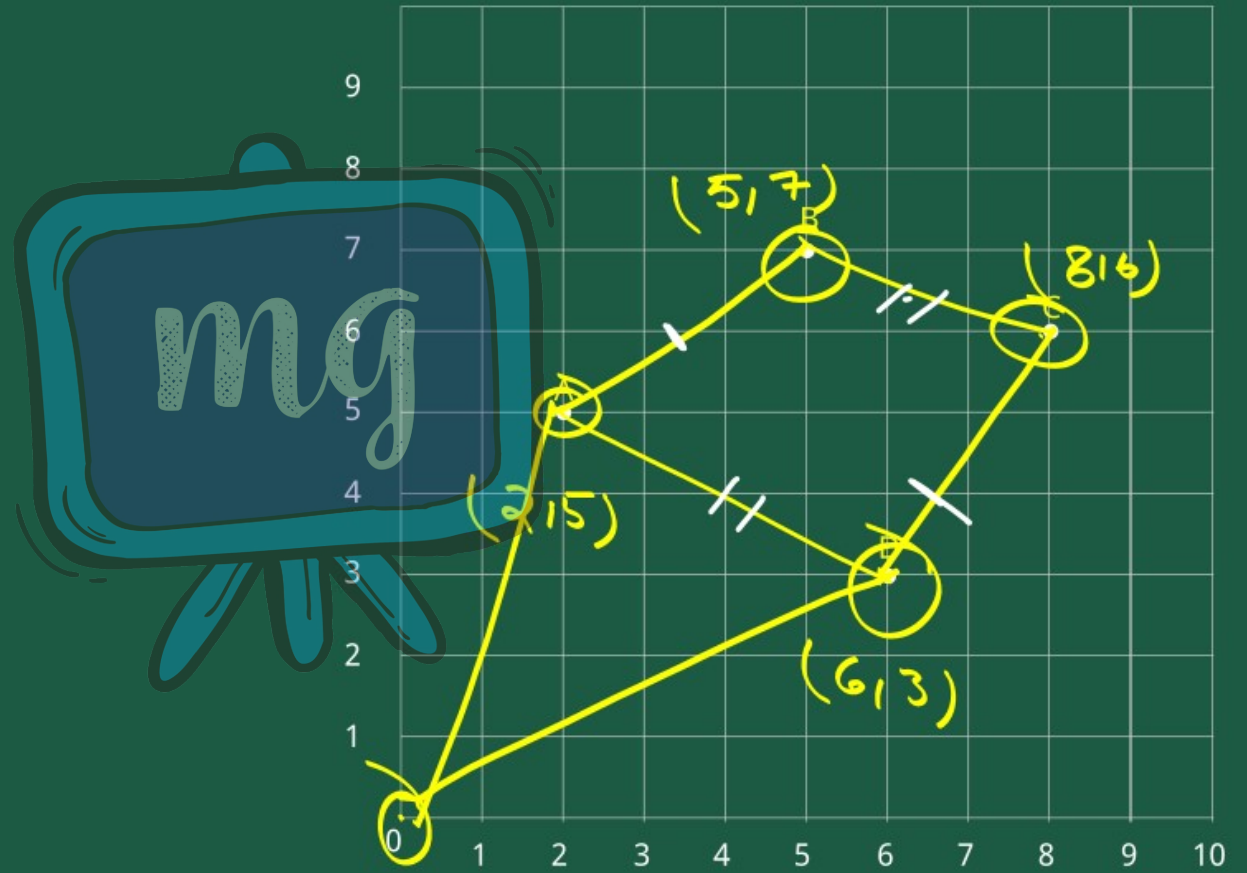
C.  $I(-2, 0), J(-2, 6), K(-8, 6), L(-8, 2)$

D.  $I(-2, 0), J(-2, -6), K(-8, -6), L(-8, -2)$

30. **Case Study** : Students of a school are standing in rows and columns in their school playground to celebrate their annual sports day. A, B, C and D are the positions of four students as shown in the figure.



(CBSE 2021 C)



Based on the above, answer the following questions :

I. The figure formed by the four points A, B, C and D is a

A. square

B. parallelogram

C. rhombus

D. quadrilateral

A (2, 5)  
B (5, 7)  
C (8, 6)  
D (6, 3)

$$\begin{aligned} AB &= \sqrt{(5-2)^2 + (7-5)^2} \\ &= \sqrt{3^2 + 2^2} \\ &= \sqrt{9+4} = \sqrt{13} \end{aligned}$$

$$\begin{aligned} BC &= \sqrt{(8-5)^2 + (6-7)^2} \\ &= \sqrt{3^2 + (-1)^2} = \sqrt{9+1} \\ &= \sqrt{10} \end{aligned}$$

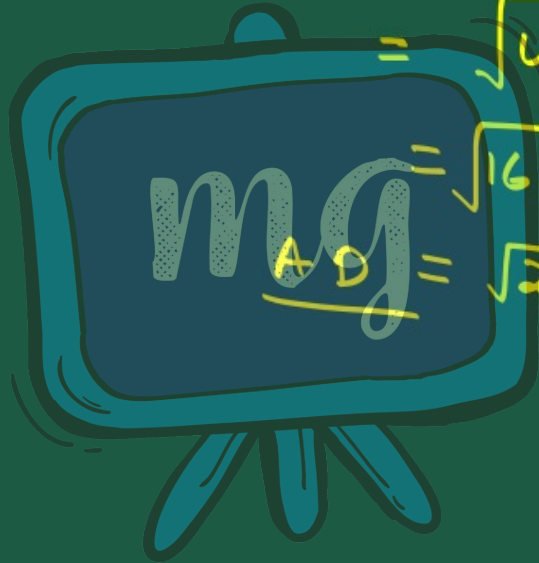
$$\begin{aligned} CD &= \sqrt{(8-6)^2 + (6-3)^2} \\ &= \sqrt{2^2 + (3)^2} \\ \frac{CD}{AB} &= \frac{4+9}{13} = \sqrt{13} \end{aligned}$$

$$AD = \sqrt{(6-2)^2 + (3-5)^2}$$

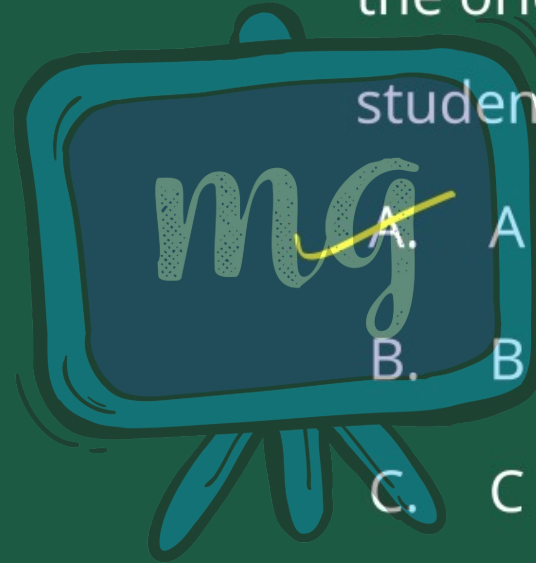
$$= \sqrt{4^2 + (-2)^2}$$

$$= \sqrt{16 + 4}$$

$$AD = \sqrt{20} \text{ unit}$$



II. If the sports teacher is sitting at the origin, then which of the four students is closest to him?



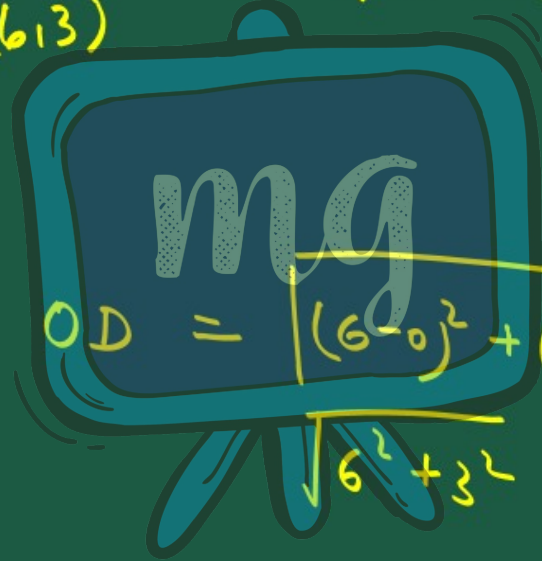
A. A

B. B

C. C

D. D

$$\begin{aligned} O(0,0) \quad A(2,5) \\ D(6,3) \end{aligned} \quad OA = \sqrt{(2-0)^2 + (5-0)^2} \\ = \sqrt{2^2 + 5^2} = \sqrt{4 + 25} = \sqrt{29} \text{ unit}$$



$$\begin{aligned} OD = \sqrt{(6-0)^2 + (3-0)^2} \\ = \sqrt{6^2 + 3^2} = \sqrt{36 + 9} = \sqrt{45} \text{ unit} \end{aligned}$$

III. The distance between A and C is

A(2,5)

C(8,6)

A. 5 units

B. 6 units

C.  $\sqrt{37}$  units

D.  $\sqrt{35}$  units

$$(8-2)^2 + (6-5)^2$$

$$\sqrt{6^2 + 1^2}$$

$$\sqrt{36 + 1} = \sqrt{37}$$

V. If a point P divides the line segment AD in the ratio 1 : 2, then coordinates of P are

$A (2, 5)$        $D (6, 3)$

A.  $\left(\frac{8}{3}, \frac{8}{3}\right)$       B.  $\left(\frac{10}{3}, \frac{13}{3}\right)$

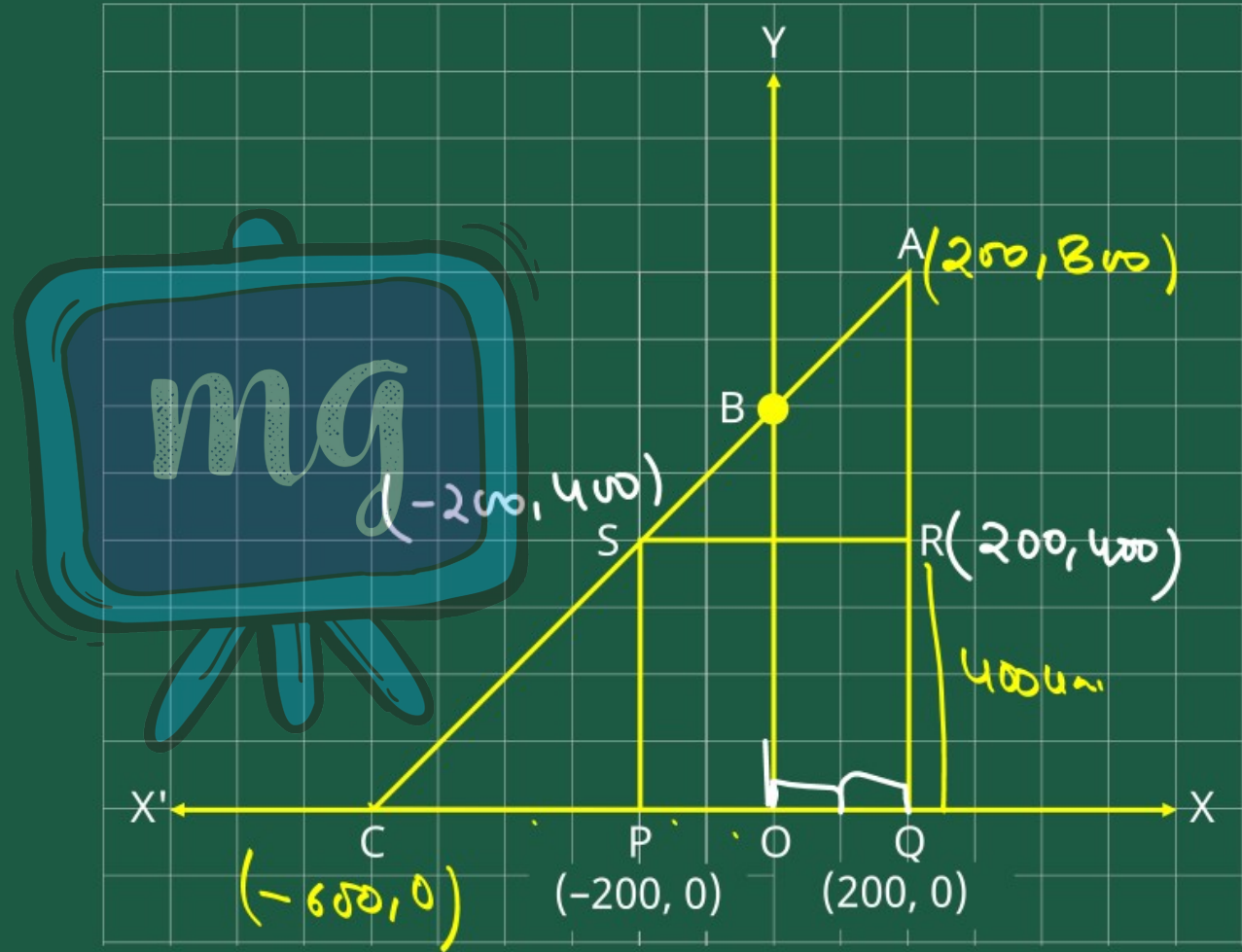
C.  $\left(\frac{13}{3}, \frac{10}{3}\right)$       D.  $\left(\frac{16}{3}, \frac{11}{3}\right)$

$$\frac{6 + 4}{3} = \frac{10}{3}$$

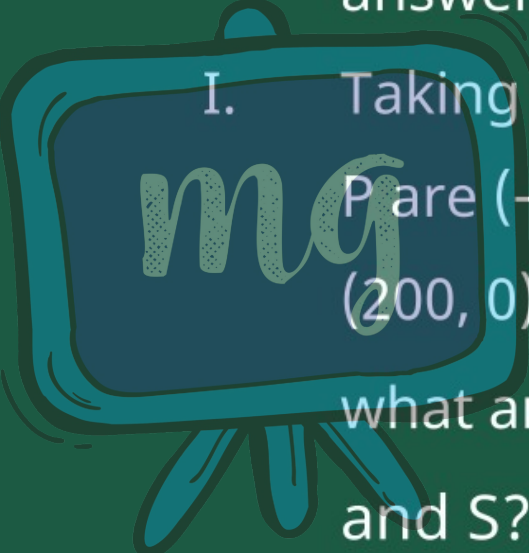
$$\frac{3 + 10}{3} = \frac{13}{3}$$

31. **Case Study** : Jagdish has a field which is in the shape of a right-angled triangle AQC. He wants to leave a space in the form of a square PQRS inside the field for growing wheat and the remaining for growing vegetables (as shown in the figure). In the field, there is a pole marked as O. **(CBSE 2023)**





Based on the above information,  
answer the following questions :



I. Taking O as origin, coordinates of P are  $(-200, 0)$  and of Q are  $(200, 0)$ . PQRS being a square, what are the coordinates of R and S?

Coordinates of R  $(200, 400)$  and  
- - - S  $(-200, 400)$

II. (a) What is the area of square  
PQRS?

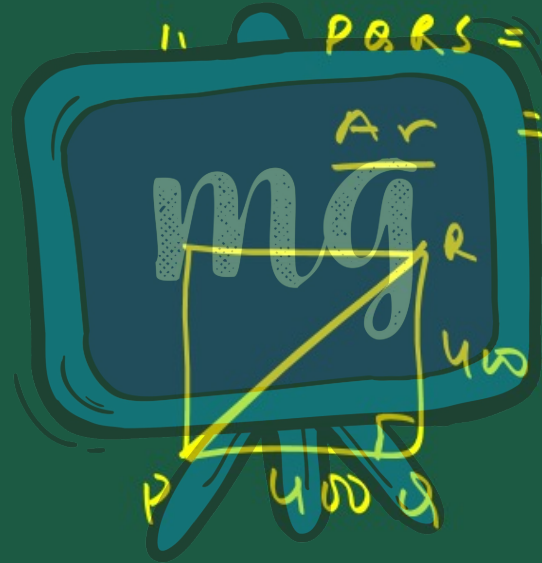
OR

(b) What is the length of  
diagonal PR in square  
PQRS?



$$\text{Area of Square} = (\text{side})^2$$

$$\therefore \text{PQRS} = (400)^2$$



$$= 160,000 \text{ Sq unit.}$$

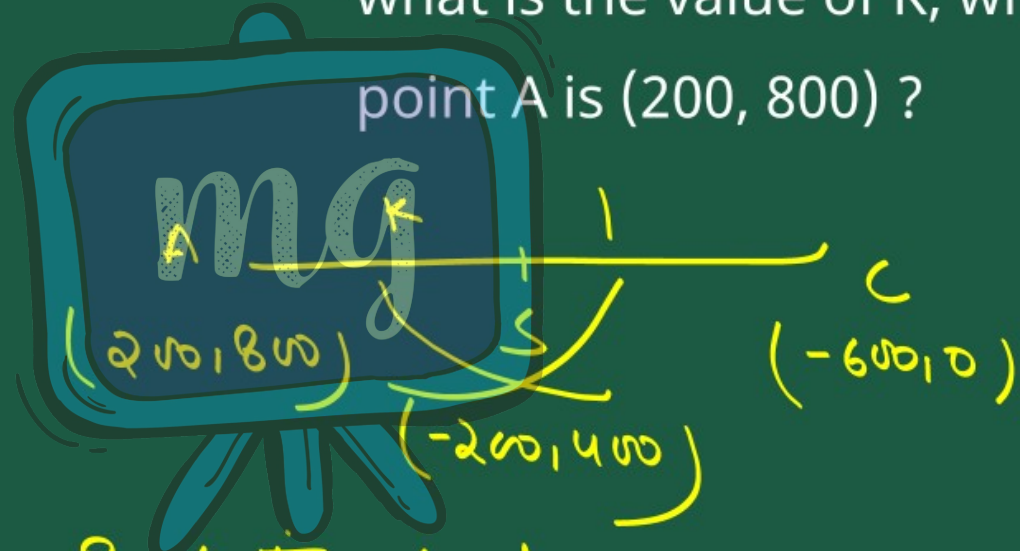
$$PR^2 = (400)^2 + (400)^2$$

$$PR^2 = 2(400)^2$$

$$PR = \sqrt{2(400)^2}$$

$$\underline{PR} = 400\sqrt{2} \text{ unit}$$

III. If S divides CA in the ratio  $K : 1$ ,  
what is the value of  $K$ , where  
point A is  $(200, 800)$  ?



By section formula.

$$x = \frac{m_2 x_1 + m_1 x_2}{m_1 + m_2} \quad \Bigg| \quad \frac{-600K + 200}{K + 1} = -200$$

$$-600K + 200 = -200(K+1)$$

$$-600K + 200 = -200K - 200$$

$$-600K + 200K = -200 - 200$$

$$-400K = -400$$

$$K = 1$$

$\frac{K}{1} = \frac{1}{1}$  } the ratio is  $K:1 = 1:1$